

ABSTRACT

Spherical-like textures are useful to simulate reflections and to generate arbitrary views from a point. For addressing simplicity, graphics systems typically require rectangular arrays of texture samples but an infinite variety of functions can be used to map these samples to a sphere-like object. A new metric is presented for measuring how well various maps use a given number of samples to provide the greatest worst-case frequency content of the image everywhere over the sphere. Using this metric and other important local properties, a comparison is presented of maps used previously in computer graphics as well as other mapping techniques borrowed from cartography. Based on these analysis several novel mapping techniques are presented that are fairly simple to implement and significantly more efficient in terms of the amount of processing and data required, and the quality of the resulting images. The novel metric and mapping techniques can be employed to analyze or otherwise improve the sampling efficiency of mapping textures onto any three-dimensional surface.